PROCEEDINGS

APCHI-ERGOFUTURE 2010

DEWA PUTU SUTJANA
I PUTU GEDE ADIATMIKA
I GUSTI NGURAH ARDANA
I. B. K. GEDE DHARMA PUTRA

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Centre for Ergonomics Studies (CeFES)

PREFACE

Dear Colleagues

Welcome to Bali. On behalf of the organizing committee, we would like to welcome all of participants of APCHI-ERGOFUTURE 2010. We do hope all of you could get more experiences from your participants in this conference in particular, and new ideas during you stay in the famous of Bali as tourist destination.

As usually, every conference should be recorded in a book or proceedings for future information and recognition. Sometimes the participants will need this proceeding for their job promotion. There many papers are printed in this proceeding according to the journal template. But, there some papers that were accepted past on deadline and were not written as same as the template.

This proceeding was design and printed based on the theme and the schedule of presentation. So, if you want to find your paper, you can use tha theme folder. Hopefully, this book can give you more achievent in your job and bring more memory about Bali to your country.

On this good opportunity, special thanks are addressed to our sponsor, government and partners that support this conference.

Thank you.

Organizing Committe

CONTENT

WELCOME FROM CONFERENCE CHAIR

Om Swastyastu,

Based on long experiences working in Human Computer Interface (HCI), Ergonomics (Erg), occupational safety and health (OSH), up to now we are practically still running at the same place. Accident or occupational diseases in fact still happening, even in the workplace equipped with up to date regulation and personal protected devices. Unsafe acts and unsafe behavior must be managed to develop safety behavior. Mind set changes become an important issue to be success. To solve that problem, Balinese Brach of Indonesian Ergonomics society supported by APCHI, PEI, IEA, Center of Ergonomics Study of Udayana University and Bali Human Ecology Study Group (BaliHESG) organize the Joint International Conference Asia Pasific Computer Human Interaction and Ergofuture 2010, namely APCHI-ERGOFUTURE 2010. The conference will be held at Sanur Paradise Plaza Hotel and Suites, Bali on 2 - 6 August 2010.

The goals are: 1. to provide guidance and direction for young ergonomist, 2. to show the unfit, improper, inappropriate research and application of ergonomics and OSH, 3. to convince that a total and a more strategic approach must be done in conducting research and application with aim to have maximum benefit.

The scientific program of APCHI-ERGOFUTURE 2010 including: 1. pre conference symposium, workshops and tutorials, 2. keynotes address, 3. free communication (parallel session) such as: human computer interface, cultural, hospital, aging, small scale industries, industrial sports, disable, children, women, cognitive, product design, displays and warning, mining, MSDs, ODAM, office, communities, transport, tourism, agriculture, architecture, school, home, industrial, etc; 4. student papers for undergraduate; 5. accompany program and 6. additional tour (under request and number of participants). To make the conference more successfully, the organizing committee invited overseas participants to participate in the conference. Bali is a paradise island with unique attraction culture shall becoming unforgettable experience to all participants.

Om Shantih, Shantih, Shantih Om,

Conference Chair
Prof. dr. I Dewa Putu Sutjana, PFK, M.Erg

WELCOME SPEECH FROM PRESIDENT OF INDONESIAN ERGONOMICS SOCIETY

Dear Colleagues,

The world has change, tight competition and complex problem will occur. The problem is related to global changes, and it will not be possible to solve the problem individually.

It needs a comprehensive approach. All experts, scientists, and stakeholders should joint and sit together to get the proper and appropriate way in implement the new information, new techniques or researches in the communities by using a simple technique and easy to use by the people. This is our task to bridge the scientists and communities in problem solving by thinking globally and act locally, using comprehensive approach.

On behalf of Indonesian Ergonomics Society or Perhimpunan Ergonomi Indonesia (PEI), I would like to welcome all colleagues interest to this conference. As a new President of PEI, I would like to say thank you very much to the APCHI that has pointed PEI as the host of APCHI 2010 and decided Bali as the location of the conference. It will be jointly organized with Ergofuture 2010.

It's a good experience if you could come to this conference, because the topics that are proposed by the organizing committee are very interesting. There many topics about human computer setting interaction and ergonomics as a whole that are organized is parallel session, key notes address, symposium and other seminars. So, please prepare your paper and send it to the organizing committee as soon as possible related to time schedule from the OC.

On this occasion, I appreciate very much to the OC who work very hard to prepare this conference. I hope all of you plan can be done properly. I hope the God bless you and the conference will be done successfully.

President of Indonesian Ergonomics Society
Dr. dr. I Putu Gede Adiatmika, M.Kes

SPEECH FROM PROMOTOR OF ERGOFUTURE

Dear Good Friends,

We shall organize ergo future International Seminar (Ergo future 2010) again in Bali, August, 2-6, 2010. This shall be jointly conducted with the Asia Pacific Computer Human Interaction (APCHI-2010)

Why we have to organize Ergofuture2010?

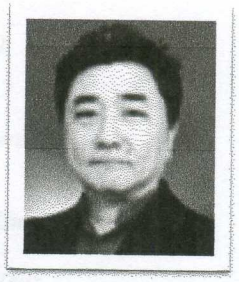
1. As problems never ended, it is logically that we have to carry out again our ergo future, not only to accomplish the residue, but also to solve the new problems we are and shall be facing in the future pro-actively.
2. Having healthy-fit human resources to be productive enough by accommodating with ergonomics working conditions and environment is really an ultimate task for ergonomists. In doing so a total approach must be done.
3. This is not an easy job and must be done through serious hard effort and must be strongly supported by new mind set.
4. Ergonomics problems and solution in agriculture, tourism, small and medium scale enterprises, sustainable development, transportation, school and education, mining, fishery, forestry, plantation, industry, military, health care, home, human computer interface, aviation, sea fares, etc are our main targets to be deliberated in this coming conference. And it shall cover children, gender, women, ageing, and disabled workers.
5. In the meantime, we should consider various facts which could highly influence this works.
   - Disasters, in term of earthquake, tsunami, flood;
   - Global warming with its impacts;
   - The emerging 24 hours society with all its consequence;
   - The still existing of old traditional economic problems,
   - Increased technology transfer problems and issues (HCI), and finally
   - The existing of old "instant noodle" mind set among policy, decision makers, and designers becoming a pile of problems which must also be seriously considered.

What Ergo future 2006 as the first ergo future attained? What are the challenges

The demand to apply a total and a more strategic approach to carry out research and application of Ergonomics and Occupational Safety-Health with aim to have maximal benefit, practically in fact have been anticipated by many researches and application based on Total Ergonomics Approach. The PhD and Master Degree Program of Ergonomics, Tourism and Environment students at Udayana University have started to use the Total Ergonomics Approach in their Dissertation and Thesis. The words of Holistic and Participation approached have been spoken / used at large, from policy makers up to the people at the grass root. New mind set, to think and act holistically, have been owned and practiced by those who concern and commit to sustainable development of Bali. The goal of better life which covers matters of health, safety, comfort and efficient elements has been increasingly being concerned and demanded by respected stakeholders from various institutions and disciplines. Interdisciplinary approach has been highly demanded and more and more disciplines needs to be involved in solving the more complex problems. Individual capacity building to work in a team becoming a must. Various efforts being done to anticipate this situation. Practice and its theory gave more color to our curriculum. Bali Island as a whole becoming our real laboratory. Integrated ergonomics SHIP approach workshops have been intensively done as a conditioning forum for participants starting to think and act holistically. And workshop which was done at our ergofutute2006 indicated a lot of home works which need serious attention and sustained solution. More hard work efforts to campaign the benefit utilization of ergonomics to the respected significant target groups are still highly needed. Bridging the gap between research and application are still becoming crucial problems which should be overcome shortly. Human relation knowledge, attitude and practice are really a strong tool to be successful. Democracy and Human Rights principle and approach becoming a must. Human Capital investment not only to be talked but has to be implemented more seriously. And your active participation in filling the gap, bridge the gap and solve the problems are highly expected. Finally looking forward to seeing you all in Bali, the last paradise in this changing world.

Prof. I. B. Adnyana Manuaba, Horn.,FErgS

SPEECH FROM APCHI COORDINATOR



As a steering committee member for APCHI conferences, we kindly invite you who specialize in the HCI and the Ergonomics to APCHI-ERGOFUTURE 2010. As an APCHI conference, this is the 9th conference following the 8th conference held in Incheon, Korea in 2008 and will be followed by the 10th conference in Tokyo, Japan in 2012.

APCHI is a regional HCI conference in Asia Pacific region but also attracts many researchers and practioners from the US and European countries. It is my pleasure that APCHI conference is now held in Bali, a beautiful and attractive place for the conference and holidays. Why don't you join us at APCHI-ERGOFUTURE 2010 and enjoy the conference and scenic beauties, and warm hearted welcomes of Indonesian people.

Masaaki Kurosu

Lighting Systems Analysis in the Laboratory of Information Systems and Decision in Bandung Pasundan University
(Approaching of Software aspect lighting DIALUX)

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Problem Formulation

1. Is the lighting at the Laboratory of Information and Decision Systems already meet the standards recommended lighting levels?
2. How much light on the need for Information and Decision Systems Laboratory in order to better meet the standards recommended lighting levels?

Troubleshooting purpose

Given this final is expected to be known whether the installed lighting is adequate and meets the standards recommended lighting levels. In addition to analyzing the lighting is installed, this thesis also aims to provide recommendations to the Information and Decision Systems Laboratory of the lighting changes

Problem Limitation

In this final will be limited to the lighting installed in the Laboratory of Information Systems and decision Pasundan University.

Problem Assumptions

At the time of the study is assumed to be stable laboratory conditions and no new policies both internally and externally from the University that can influence the course of research.

Troubleshooting steps:

1. Determination of background research
   In this step necessary data about the situation and activities that run in the laboratory.
2. Formulation of the problem
   The next step after understanding the situation at the Laboratory, namely by providing solutions to solve it so that the original purpose of the analysis can be determined and given certain limitations.
3. Limits problem
   The limitations of existing problems in this research is on Information and Decision Systems Laboratory course.
4. Research purposes
   In order to achieve desired goals, namely to analyze the lighting in the Information and Decision Systems Laboratory that is considered and no assessment can be influenced to determine penvahayaan good and accepted standards.
5. Data collection
   The collection of necessary data is by doing surveys directly into the Laboratory Information System and Decision. The data is obtained is the result of Illuminance measurement (amount of light that falls on a horizontal or vertical field of work, usually called "Strong light") by using an illuminance meter (Lux Meter).

6. Data processing
   All data will be compared with results obtained using software DIALux course in accordance with applicable standards.
7. Conclusions and recommendations
   After all data processing is completed, then the conclusion can be drawn on the results obtained and to provide suggestions that may help and give input for the parties concerned.

Lighting minimum required level Based on type of activity, level of minimal lighting (LUX) and facts:

1. Menial jobs and are not kept - going 100 lux; rooms & hall storage of equipment / installations that require continuous Menial jobs and kept - going 200 lux
2. Works with rough assembly of machinery and 300th Space administrative chores, control room, machine work & assembly / compiler
3. Making Work a little smoother – 500 lux ; picture or working with office machines; inspection of work or working with machinery.
4. Works fine – 1000 lux ; color selection, processing, smooth & assembly machines work fine.
5. Not very fine job – 1500 lux ; shadows sculpt by hand, checking the machine work and assembly is very smooth.
6. Detailed – 3000 lux Work No Vetting ; job shadows very smooth assembly

Source: KEPMENKES RI. No. 1405/MENKES/SK/XI/02

Data Processing

The main stage lighting system before making changes is to measure the first lighting system was installed using software Dialux. This is done in order to know the number of lumens output at room Information and Decision Systems Laboratory.

Is the standard TLD 36W/54 lamps type mounted on Information and Decision Systems Laboratory, as for information that should be known is as follows (Lamp and Gear Philips Catalogue):

- Rate Average life: 13 000 hours
- Light output: 2500 lumens
- Lumen maintenance at 10 000 hours:> 80% = 4000 lumens
- Assumption lamp usage (hours / days): 12 hours
- Assumption use of light in one year: 12 x 365 = 4380 hours / year
- Assumption mounted lamp life (2002-2009): 7 years
- Total use of light during the seventh year: 7 x 4380 = 30 660 hours
- Lumen output per point remaining lamp: 1000 lumens
- Spot light on the laboratory: 15 spot lights
- The number of lights in the laboratory: 30 lamps
- The total lumen output remaining: 1000 x 15 = 15 000

Analysis of Existing Lighting System

- Position Lamp
  After going through the process of data processing using software Dialux found that, for the placement of the light point on the existing condition in the Laboratory Information System and Decision is correct and does not need to be changes in the position of light point, because it was in accordance with Dialux software.
- Home Lighting
  After a review carried out directly in Information and Decision Systems Laboratory, found that the state of the lamp house is very dirty because of dust existing thus affecting the light reflector to spread light. Steps should be done is cleaned in order to maximize reflector lamps in the

ad of light.
selection of home lighting that is considered less appropriate with the existing activities in Laboratory of Information and Decision Systems, so it can not maximize the existing ing.

) (tube)
ting conditions are less than 7 years (2002 to present) is attached at the Laboratory of rmation and Decision Systems and approximately 80% of lamp lumen (tube) is gone out a replacement, making the light and not the maximum illuminance.

ad Light
tion lights, house lights and lighting all affect the illuminance at the Laboratory of rmation and Decision Systems. In accordance with the calculation of the flatness obtained ware Dialux light at the Laboratory of Information and Decision Systems is 66 lux. This rly illustrates that the condition of existing only in Laboratory Information Systems and ision does not meet the minimum illumination levels required by KEPMENKES RI. No. 5/MENKES/SK/XI/02, which for minimum lighting levels according to its activity is 300 to 500 lux.

nputer Location
main goal of artificial light in the Information and Decision Systems Laboratory is to vide lighting for every activity that is particularly helpful in conducting activities of the eye g the computer. The location of the computer desk that is not parallel with the lamp position emanding flatness is the maximum luminance .

is of the New Lighting System
eeing the results obtained using software Dialux, new lighting system was able to meet the g lighting standards, so that was the old lighting system should be replaced with new lighting Seeing that the new lighting system has several advantages including:

All data processing, which in this thesis using Dialux software. This software is widely used by architects in Indonesia and Europe. Besides well-known company like Philips, LG and Bega to refer this software for lighting design.

Database software using PHILIPS lamp type, so that exactly match the type of lamp is in Laboratory Information Systems and Decision Pasundan University.

All lights (tube) is new, use the type TL-D 36W/54.

Each point can released 5000 lumen lamp. This is of course in accordance with existing standards, so certainly the overall lumen output can be achieved as many as 75 000 lumens. In addition, the flatness room lux for Information and Decision Systems Laboratory is to be 332 lux.

ortcomings of this new lighting system is as follows:

Due to cost reasons, this type of lamp used as a substitute for the existing lighting system was still using a type that has not environmentally friendly. And also lamp life is still not maximal.

In addition, the house lights are used is still utilizing the existing lamp house, to minimize the cost, considering the price is quite expensive to replace the lamp house. But, using the existing type of light is sufficient to meet the minimum lighting level of 300 lux to 500 lux.

the steps to improve the existing lighting system into the new lighting systems, namely:

Remove all lamps (tubes) to replace existing with new ones, and do not forget to not break the tube, this is done to prevent air pollution.

Cleaning dirty reflector lamp house with cleaning fluid. This is done in order to maximize the performance of reflector

Based on the above data, there are some things that might to be done to change the existing lighting system into a new lighting system, namely:

- Changing the TL-D 36W/54 tubes into existing TL-D 36W/54 new.
- Cleaning the house reflector lamps.
- Provide anti-thermal coatings for cables directly adjacent to the ballast.

Following is the impact of changes in existing lighting to a new lighting system:

- Creating an environment that allows residents to see in detail and implementation of tasks and visual tasks easily and accurately.
- Provide lighting with an intensity that remained spread evenly, not blinking, and no blinding.
- Improving the visual environment comfortable and improve achievement.

Conclusion

After analyzing the problem, understand, learn and try to resolve issues raised in the place of the author conducted research thesis, the writer can draw conclusions from the analysis of lighting systems. The conclusions drawn from this research are as follows:

- The Laboratory of Information Systems and Decision needed replacement lamp TL-D 36W/54 with a new one given the age of the lamp is more than the maximum usage.
- Change of lux when the existing lighting system was replaced be a new lighting system from 66 lux to 332 lux, so the lighting in this room can be in accordance with RI KEPMENKES. No. 1405/MENKES/SK/XI/02.

Refferences

Imansyah S, Budi. 2003. Himpunan Ahli Kesehatan Lingkungan Indonesia, Sinar Harapan.
KEPMENKES RI. No. 1405/MENKES/SK/XI/02.
SNI 03-6575-2001,"Tata Cara Perancangan Sistem Pencahayaan Buatan Pada Bangunan Gedung".
Suma'mur, 1986. "*Ergonomic* Untuk Produktivitas Kerja".